



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/602,791	06/24/2003	William Leon Rugg	STL10987	1683

7590

02/01/2006

Dereck J. Berger
Seagate Technology LLC
Intellectual Property - COL2LGL
389 Disc Drive
Longmont, CO 80503

EXAMINER

WATKO, JULIE ANNE

ART UNIT

PAPER NUMBER

2653

DATE MAILED: 02/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/602,791

Applicant(s)

RUGG ET AL.

Examiner

Julie Anne Watko

Art Unit

2653

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-13, 16 and 20 is/are rejected.
- 7) ☒ Claim(s) 7, 14, 15 and 17-19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 8 is objected to because of the following informalities: Claim 8 recites the limitation "the flexible circuit". The Examiner suggests -- the flexible printed circuit -- for consistency with claim 5. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-2, 4-5, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sega et al (EP 760510) in view of Crane, Jr. et al (US Pat. No. 6797882 B1).

As recited in claim 1, Sega et al show a data storage device comprising: a base plate (part of 17) having a top surface; a spindle motor 3 positioned on the top surface of the base supporting one or more data storage discs for rotation on the spindle motor; an actuator assembly 8 positioned on the top surface of the base plate adjacent the data storage disc; and a printed circuit board 21 assembly on the top surface of the base plate having actuator and motor electronic control components 20 thereon on the top surface of the base.

As recited in claim 1, Sega et al are silent regarding the printed circuit board being a flex printed circuit board.

As recited in claim 1, Crane, Jr. et al teach that "instead of connecting the flexible circuit board 800 to a printed circuit board having active and/or passive elements, a portion of the flexible circuit board 800 may include a stiffener. The stiffened portion of the flexible circuit board 800 can thus replace the printed circuit board described above" (see col. 9, lines 53-58).

Art Unit: 2653

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the printed circuit board of Sega with a stiffened portion of the flexible circuit board as taught by Crane, Jr. et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to replace the board with the stiffened portion in order to simplify assembly by eliminating a connection step as is notoriously well known in the art.

As recited in claim 2, Sega et al show a power combo chip (part of 20) positioned on the printed circuit board assembly positioned on the top surface of the base.

As recited in claim 4, Sega et al show an interface connector 16 attached to the flex printed circuit board and to the base plate.

As recited in claim 5, Sega et al are silent regarding a stiffener attached to a bottom surface of the flexible printed circuit.

Regarding the limitation "stiffener": See teaching, rationale, and motivation to combine teachings above for claim 1.

Regarding the limitation "bottom surface": There is no invention in relocation of known or obvious parts, absent evidence that the functioning of the device is changed by the claimed location. In re Japikse, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950).

As recited in claim 8, Sega et al show that the printed circuit board 21 has a coextensive portion inserted into an interface connector 24 (see Fig. 12).

As recited in claim 8, Sega et al are silent regarding the flexible circuit and the stiffener.

See teachings, rationale and motivation for combining teachings above for claim 1

Art Unit: 2653

4. Claims 3 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sega et al (EP 760510) in view of Crane, Jr. et al (US Pat. No. 6797882 B1) as applied to claims 1-2, 4-5, and 8 above, and further in view of Koo et al (US Pat. No. 6243262).

Sega et al show a data storage device as described above.

As recited in claim 3, Sega et al show a top cover 19 attached to the base to form an enclosed space ("disk/actuator chamber 25", see col. 7, line 56) enclosing the actuator assembly, the one or more data storage discs and the spindle motor.

As recited in claim 3, Sega et al arguably show the actuator and motor electronic control components on the printed circuit board assembly are outside the enclosed space (insofar as printed circuit board 21 is located beneath package cover 23 in "package chamber 26" (see col. 8, lines 5-8), and not beneath disk/actuator cover 19 in disk/actuator chamber 25); however, even if the printed circuit board of Sega et al were interpreted as not being "outside the enclosed space", the claim would still be obvious as follows.

As recited in claim 3, Koo et al teach putting actuator and motor electronic control components outside an enclosed space (see Figs. 3-4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to reconfigure the enclosed space of Sega et al by removing package cover 23 so as to locate the actuator and motor electronic control components outside the enclosed space as taught by Koo et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to locate the actuator and motor electronic control components outside the enclosed space so as to externally expose the circuit parts in order to discharge heat as taught by Koo et al (see col. 4, lines 1-8).

Art Unit: 2653

As recited in claims 9 and 11, Sega et al show that the flexible printed circuit comprises a pigtail lead 14 extending beneath the cover 19 to the actuator assembly to connect the electronics components to the actuator assembly.

As recited in claim 10, Sega et al show that the flexible printed circuit comprises a pigtail lead 15 extending beneath the cover 19 to the spindle motor.

5. Claims 6 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sega et al (EP 760510) in view of Crane, Jr. et al (US Pat. No. 6797882 B1) as applied to claims 1-2, 4-5, and 8 above, and further in view of Bennett (US Pat. No. 6388834 B1).

Sega et al show a device as described above.

As recited in claim 6, Sega et al are silent regarding a metal stiffener forming a ground plane for circuitry on the flexible printed circuit.

As recited in claim 6, Bennett shows a metal stiffener 184 forming a ground plane for circuitry on the flexible printed circuit.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the stiffener of Bennett to the flexible printed circuit as taught by Bennett and Crane, Jr. et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to eliminate an assembly step as taught above with reference to Crane, Jr. et al, and to reduce read errors by producing an inexpensive and easily installed alternative pathway for EMI noise as taught by Bennett (see col. 1, line 54-col. 2, line 57).

Regarding the limitation "coextensive" in claim 12: There is no invention in a change of shape of known or obvious parts, absent evidence that the functioning of the device is changed by the claimed location. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Sega et al show that the interface connector is attached to the printed circuit board, such that, when the printed circuit board is replaced by the flexible printed circuit and the stiffener according to the above teachings, the interface connector would be attached to the flexible printed circuit and the stiffener as recited for claim 13.

6. Claim 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bennett et al (US Pat. No. 6388834 B1) in view of Crane, Jr. et al (US Pat. No. 6797882 B1).

As recited in claim 16, Bennett et al show a printed circuit assembly comprising: a flexible printed circuit (including 136), a stiffener plate (184, for example) coextensive with a portion of the flexible printed circuit forming a ground plane connected to the one or more components.

As recited in claim 16, Bennett et al are silent regarding the one or more electric circuit components requiring a ground and a power connection mounted on the flexible printed circuit.

As recited in claim 16, Crane, Jr. et al teach that “instead of connecting the flexible circuit board 800 to a printed circuit board having active and/or passive elements, a portion of the flexible circuit board 800 may include a stiffener. The stiffened portion of the flexible circuit board 800 can thus replace the printed circuit board described above” (see col. 9, lines 53-58).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the “disc drive printed circuit board (not shown)” of Bennett et al (col. 4, line 33) with a stiffened portion of the flexible circuit board as taught by Crane, Jr. et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to replace the board with the stiffened portion in order to simplify assembly by eliminating a connection step as is notoriously well known in the art.

Art Unit: 2653

By applying the teaching of Crane, Jr. et al to the device of Bennett et al, the one or more discrete circuit components fastened to the disc drive printed circuit board of Bennett et al would become fastened to the flexible printed circuit and to one of the ground and power planes as recited in claim 20.

Allowable Subject Matter

7. Claims 7, 14-15 and 17-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record neither shows nor suggests forming the power plane from or on the stiffener.

Conclusion

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

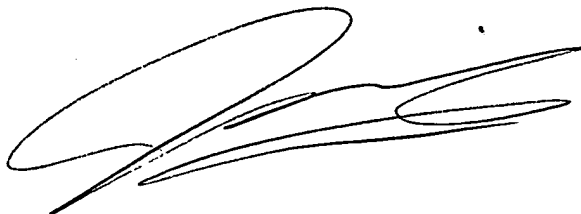
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julie Anne Watko whose telephone number is (571) 272-7597. The examiner can normally be reached on Tuesday, 11A-5P, Wednesday, 3P-9P, Thursday, 11:30A-10P, Friday, 10A-8:30P, Saturday, Noon-8:30P.

Art Unit: 2653

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William R. Korzuch can be reached on (571) 272-7589. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Julie Anne Watko
Primary Examiner
Art Unit 2653

January 28, 2006
JAW

A handwritten signature in black ink, appearing to read 'Julie Anne Watko', with a large, stylized flourish at the end.